

## BEST AVAILABLE COPY

9/7/93

CONCEPT NAME: AUTO STICK

SYSTEM DESCRIPTION:

SUPER 10 RTLO-14610B

NORMAL SHIFT LEVER IN CAB

SHIFT KNOB HAS NO RANGE OR SPLITTER BUTTON. HAS PAD SWITCH UNDER  
SHIFT KNOB MEDALLION

CAB-MOUNTED TRANSMISSION ECU

SPLITTER CYLINDER IS CONTROLLED BY ELECTRIC SOLENOID(s), 12 v. FROM  
ECU

SENSOR IN CASE OR S.B. HSG. TO SENSE MAINSHAFT RPM, CONNECTED TO  
TRANS ECU

SENSOR IN CASE OR S.B HSG. TO SENSE AUX DRIVE GEAR SPEED, CONNECTED  
TO TRANS. ECU (IN FUTURE PRODUCT, MAY BE POSSIBLE TO USE ONE  
CONNECTOR FOR BOTH SENSORS.)

J-1939 LINE FROM TRANSMISSION ECU TO VEHICLE

## OPERATION

DRIVER ACTIONS ARE IN BOLD

[TRANSMISSION ACTIONS ARE IN BRACKETS]

---

START VEHICLE THE NORMAL WAY, WITH CLUTCH

ACCELERATE VEHICLE

THE DRIVER HAS NO RESPONSIBILITY ON THE AUTOMATIC SHIFTS, KEEPS THE  
FOOT ON THROTTLE

**FIRST (AUTOMATIC SPLITTER) SHIFT:**

[AT 1475 RPM THE TRANSMISSION ECU PRESELECTS THE SPLITTER, DEFUELS ENGINE OVER J-1939 LINK, SENSES SPEED ERROR BETWEEN MAINSHAFT AND MPH AND TURNS ENGINE FAN ON FOR 1 SECOND. TRANSMISSION ECU LOOKS FOR FOR ZERO SPEED ERROR AND THEN RETURNS THE THROTTLE TO DRIVER'S CONTROL.)

\*\*\*\*\*

**SECOND (DRIVER INITIATED) SHIFT**

VEHICLE APPROACHES 1800 RPM.

**LEVER UPSHIFT: DRIVER GRASPS SHIFT KNOB & APPLIES PRESSURE TO MOVE OUT OF GEAR. THIS ACTIVATES THE SWITCH ON TOP OF SHIFT KNOB. DRIVER DOES NOT HAVE TO RELEASE THE THROTTLE. DRIVER DOES NOT PRESS THE CLUTCH PEDAL AT ANY TIME DURING THE SHIFT.**

[TRANSMISSION POWERS SPLITTER SOLENOID AND DEFUELS ENGINE. AS SOON AS TRANSMISSION SEES SPEED ERROR WITH SPEEDOMETER IT STOPS THE MOVEMENT OF THE SPLITTER CLUTCH (USING A MEANS YET TO BE DETERMINED.)]

**THE DRIVER MOVES SHIFT LEVER INTO ANOTHER LEVER POSITION WITHOUT GEAR RAKING AND WITHOUT ANY REQUIREMENT TO TIME LEVER ENTRY INTO THE NEXT POSITION.**

[TRANSMISSION MONITORS ENGINE AND MAINSHAFT RPM TO DETERMINE WHEN LEVER GETS INTO GEAR, AND TO SEE WHICH GEAR. TRANS. DECIDES WHETHER TO SHIFT SPLITTER TO DIRECT OR OVERDRIVE AND ORDERS THE ENGINE TO THE CALCULATED NEW RPM. WHEN TRANSMISSION SEE ZERO SPEED ERROR, IT RETURNS CONTROL OF THROTTLE TO THE DRIVER.]

\*\*\*\*\*

## **D O W N S H I F T S**

### **AUTOMATIC (SPLITTER) DOWNSHIFT:**

**[THE TRANSMISSION DECIDES THE DOWNSHIFT POINT CONSIDERING MPH, RPM AND THE THROTTLE POSITION.]**

**[TRANSMISSION DEFUELS ENGINE, POWERS THE SPLITTER SOLENOID, COMMANDS ENGINE UP, SENSES ZERO SPEED ERROR AND RETURNS THROTTLE TO DRIVER.]**

### **LEVER DOWNSHIFTS:**

**FROM ENGINE SOUND, FEEL AND SPEEDOMETER, DRIVER DETERMINES IT'S TIME TO DOWNSHIFT, GRASPS SHIFT KNOB & APPLIES PRESSURE TO MOVE OUT OF GEAR. THE DRIVER'S HAND ACTIVATES THE SWITCH ON TOP OF THE KNOB. DRIVER DOES NOT HAVE TO RELEASE THROTTLE. DRIVER DOES NOT PRESS THE CLUTCH PEDAL AT ANY TIME DURING THE SHIFT.**

**[TRANSMISSION POWERS SPLITTER SOLENOID AND DEFUELS ENGINE. AS SOON AS TRANSMISSION SEES SPEED ERROR BETWEEN FRONT BOX AND SPEEDOMETER, IT STOPS MOVEMENT OF THE SPLITTER CLUTCH (USING A MEANS TO BE DETERMINED).]**

**THE DRIVER MOVES SHIFT LEVER INTO ANOTHER LEVER POSITION WITH LITTLE EFFORT, WITHOUT GEAR RAKING AND WITHOUT ANY REQUIREMENT TO TIME ENTRY.**

**[TRANSMISSION MONITORS ENGINE AND MAINSHAFT RPM TO DETERMINE WHEN LEVER GETS INTO GEAR AND WHICH RATIO IT IS IN. TRANS. DECIDES WHETHER TO SHIFT SPLITTER INTO DIRECT OR OVERDRIVE AND ORDERS THE ENGINE TO GO TO THE CALCULATED NEW RPM. WHEN TRANS SEES ZERO SPEED ERROR, IT RETURNS THROTTLE CONTROL TO THE DRIVER.]**

\*\*\*\*\*

**EXAMPLES OF SOME UNPLANNED, UNUSUAL EVENTS:****EVENT 1:**

**THE DRIVER HAS SELECTED A FRONT BOX RATIO THAT IS TOO HIGH FOR THE VEHICLE SPEED:**

**[TRANSMISSION DROPS ENGINE TO IDLE. TRANS POWERS THE SPLITTER SOLENOID TOWARD OVERDRIVE (IF TRANS IS NOT ALREADY IN OVERDRIVE) AND ATTEMPTS TO GET SPLITTER IN GEAR.]**

**DRIVER IS RESPONSIBLE TO SELECT A LOWER LEVER POSITION THAT IS USABLE.**

\*\*\*\*\*

**EVENT 2:**

**THE DRIVER HAS SELECTED A FRONT BOX RATIO THAT IS TOO LOW FOR THE VEHICLE SPEED:**

**[TRANSMISSION RAISES ENGINE TO MAXIMUM GOVERNOR OVERRUN RPM. TRANS. CONTINUES THIS ACTION UNTIL DRIVER SHIFTS THE LEVER INTO A GEAR THAT IS WITHIN THE RANGE OF THE ENGINE. TRANS. THEN ADJUSTS ENGINE RPM AND SHIFTS SPLITTER INTO APPROPRIATE GEAR.]**

**THE DRIVER IS RESPONSIBLE TO SELECT A HIGHER GEAR THAT IS USABLE.**

\*\*\*\*\*

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**